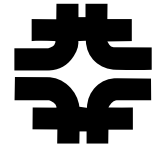


THE SWITCHYARD 120 PROGRAM

Rick Coleman

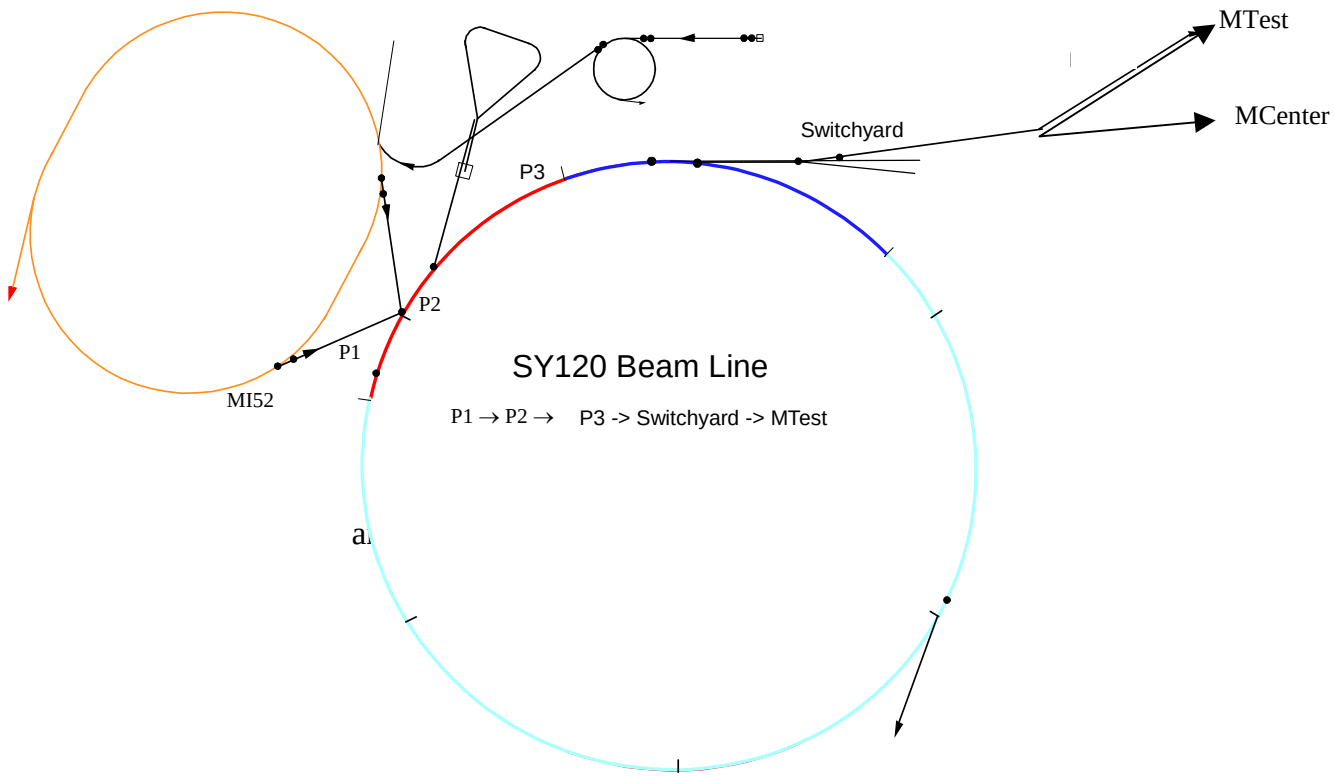
Fermilab

March 29, 2005

SY120 History

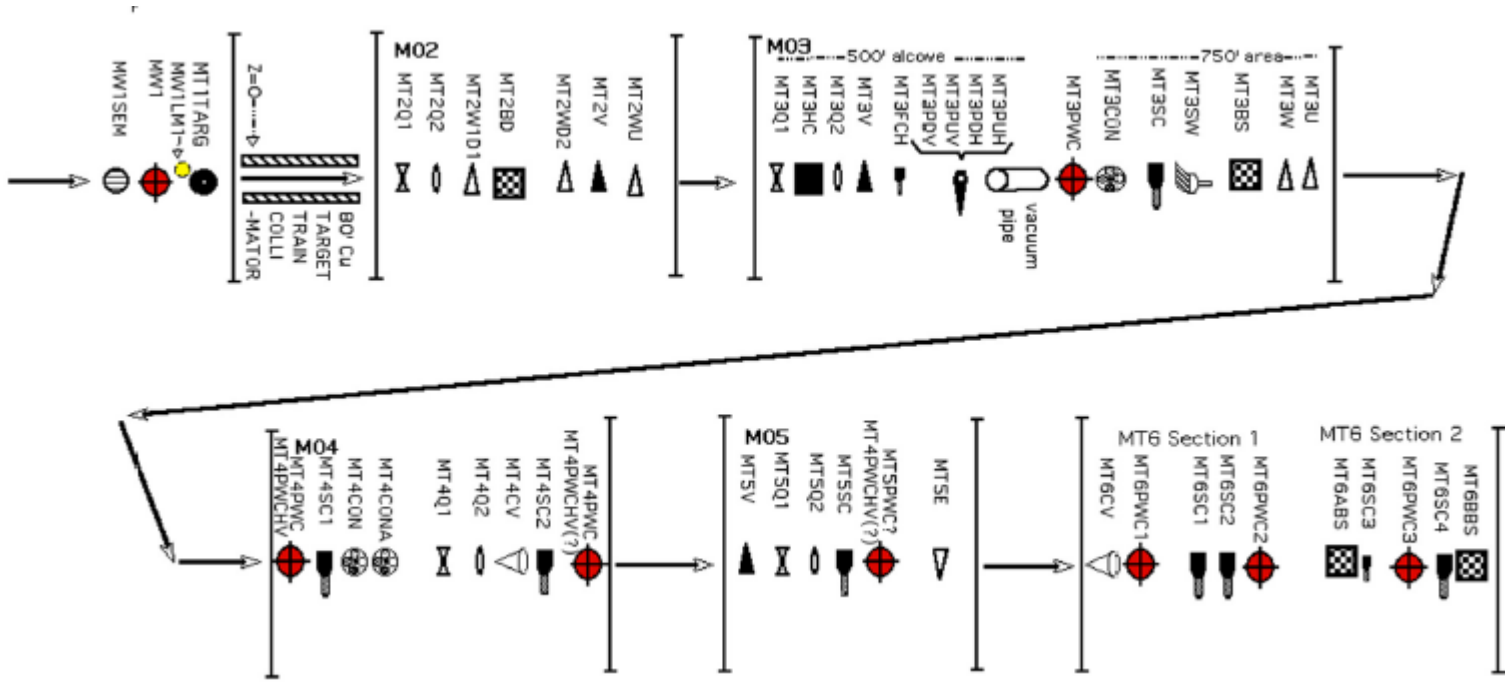
- May-July 2003 Single Turn Extraction SY
- Aug 2003 Meson Test 2003 1st user
- Fall 2003 Resonant Extraction
- 2004 MIPP commissioning and Meson Test running
- limited repetition rate running (0.3 to 0.6 sec long slow spill per min)
- Dec 2004 MIPP data taking began
- high repetition running (up to 13 cycles per minute)

SY120 Layout



3 km beam line from MI52 to MT6 and MC7

Meson Test Beamline



120 GeV protons, 4-66 GeV secondary beams

MESON TEST USERS

List of MTBF Memoranda of Understanding (MOU):

T926: RICE Signed / Experiment completed

T927: BTeV Pixel Signed / Taking data

T930: BTeV Straw Signed / Taking data

T931: BTeV Muon Signed / Experiment Complete

T932: Diamond Detector Signed

T933: BTeV ECAL Signed / Taking data

T935: BTeV RICH Signed / Experiment completed

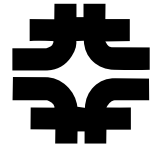
T936: US/CMS Forward Pixel Signed / Taking data

T941: UIowa PPAC Test Signed / Experiment completed

T943: U. Hawaii Monolithic Active Pixel Detector Signed/completed

T945: COUPP Signed

International Linear Collider Test Beam Proposal



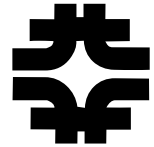
- Fermilab TM-2291 Feb 2005 requests Calorimeter/Muon Detector Test Beam

- Broad Range of particle types(e,pi,u,p)

- Energy electrons(1-25 GeV) requested

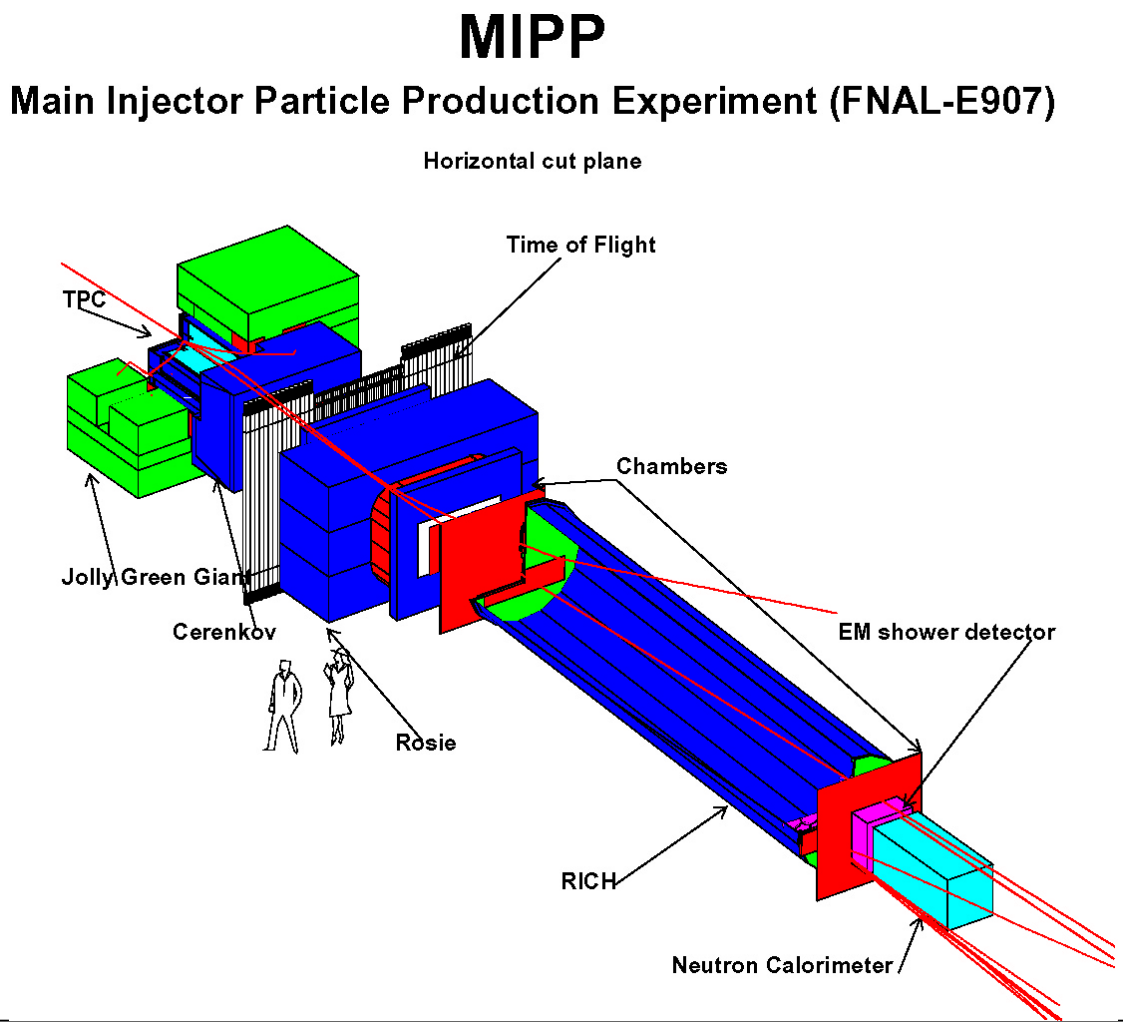
- High Energy electrons (25 GeV) and low energy pions (1 GeV) are problem for Meson Test

Impact Statement for ILC request for test beams

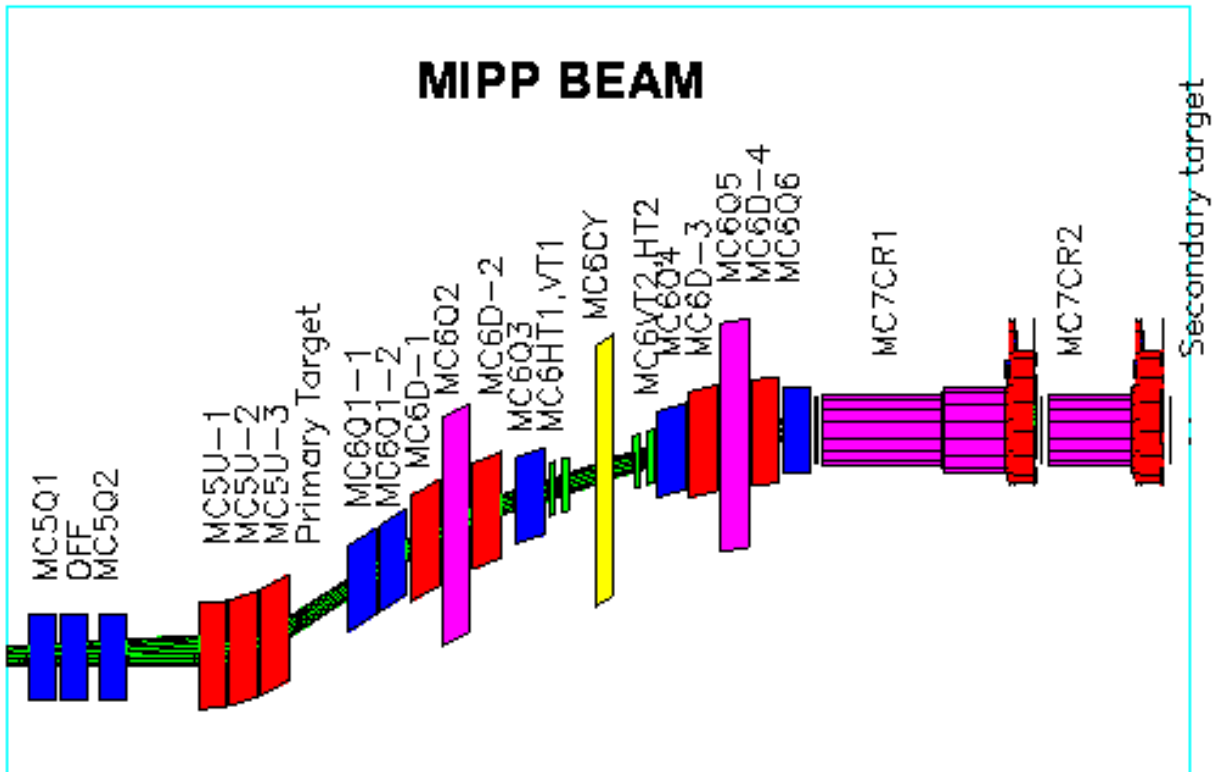


- We have achieved 4 GeV hadron beams but 1 GeV is not possible with current test beam- the distance from the target to test beam area is too long
- Meson Test is limited by shielding in how close protons can target to test beam area
- Meson Center is not as limited and a short beamline could be targeted close to test beam area

Meson Center
MIPP FNAL-E907

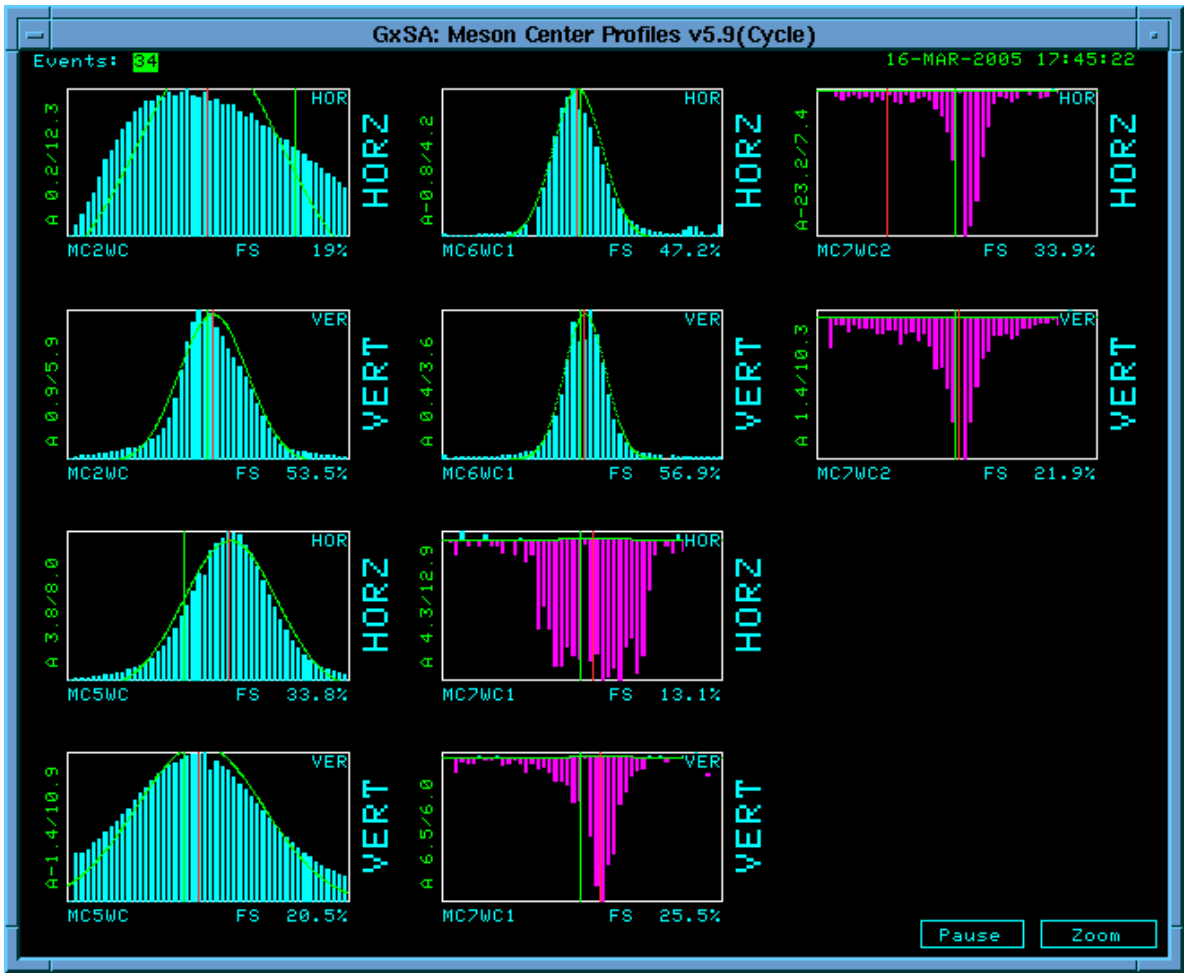


MIPP Secondary Beam



5-90 GeV secondaries or 120 GeV protons

MC/MIPP Beam Profiles



E906 approved 2001- MC or MW

Proposal for
Drell-Yan Measurements
of Nucleon and Nuclear Structure with the
FNAL Main Injector.

The P906 Collaboration

April 9, 1999

Abstract

We propose to make precise measurements of the fractional momentum (x) dependence of the ratio of the d-antiquark to u-antiquark distributions in the proton, $\bar{d}/\bar{u}$, using proton induced Drell-Yan reactions at 120 GeV. Recent E866 measurements unexpectedly suggest considerable x-dependence in this ratio at x >0.2. High intensity primary proton beams from the Main Injector make it possible to extend the x range of the E866 measurements with high precision. The apparatus will also be used to precisely measure the change in the $\bar{u}$ distributions in nuclear targets at x >0.2.

Switchyard 120 Design Report

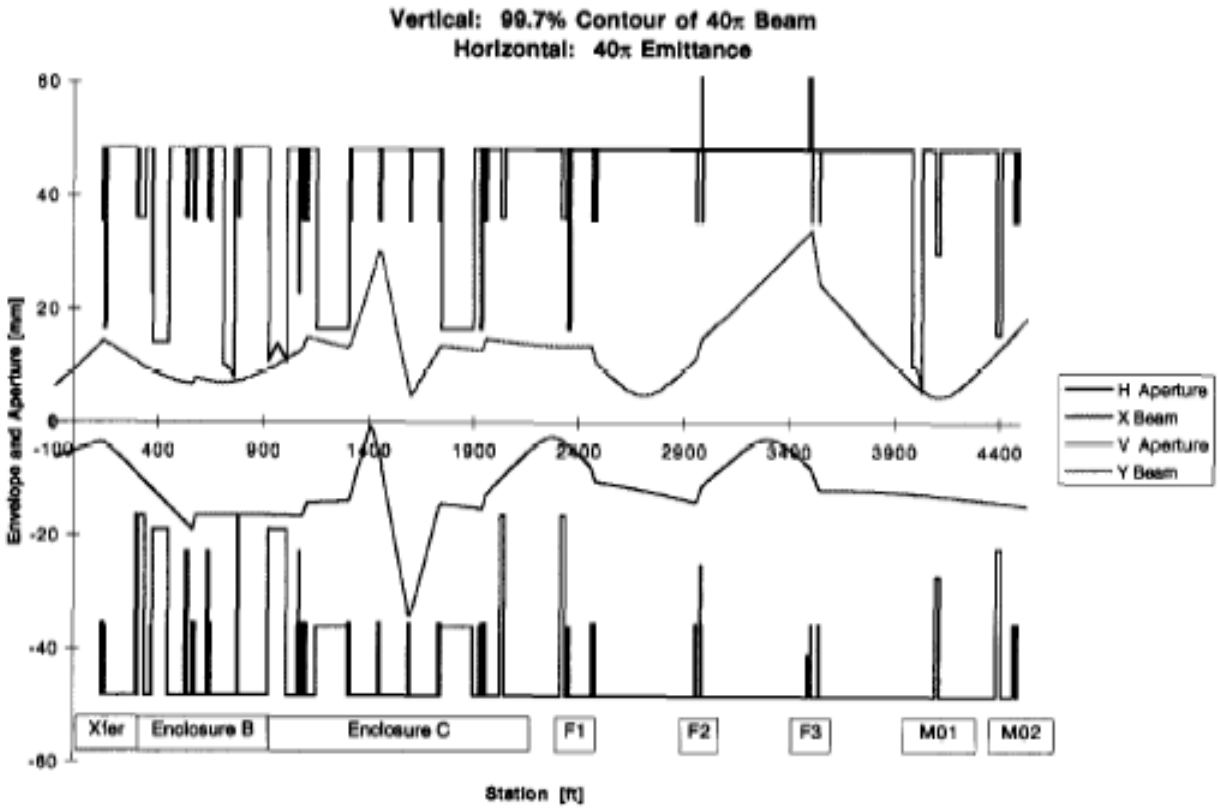
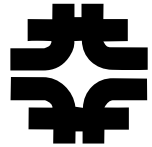


Figure 8. Comparison of Meson line envelopes with critical apertures

SY120 phase II upgrades



- Need to add quadrupoles in F2 and F3
- This requires moving F1 septa downstream to M01 enclosure
- Finally Meson enclosures M01 and M02 need rework to match into upgraded switchyard
- Also revisit P3 to Switchyard optics without the constraint to preserve Proton Line